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RECORDS OF THE QUEEN VICTORIA MUSEUM, LAUNCESTON

A Revision of the Genus *Paragalaxias*

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In 1935 Scott described a galaxiid fish from Tasmania as having biserial teeth in the jaws and differing also from typical *Galaxias* in the more anterior dorsal fin insertion, the low number of vertebrae (44) and the six-rayed ventral fins. He created the genus *Paragalaxias* for this fish, and named the species *shannonensis* after the Shannon River from which it was obtained. Barnard (1943), however, regarded this description as an erroneous one, and stated that when the head of a South African *Galaxias* was cleared in a special reagent all the rows of teeth which ordinarily appeared to be uniserial were found to have a decumbent series of replacer teeth adjacent to them. He expressed the opinion that a similar arrangement existed in *Paragalaxias* and that the replacer row had been mistaken by Scott for an operative row. In an attempt to clarify the position the present writer forwarded specimens of several New Zealand species of *Galaxias* to Dr. Barnard who very kindly made preparations of the dental structures in all, and returned them with examples of the South African species *zebratus*. All of these preparations show the decumbent row in addition to the operative row, the degree of development in the New Zealand species being similar to that in the South African one.

The decumbent teeth, which lie within the flesh, are quite distinct in favourable specimens, but they are non-rigid and come away with the tissue when dissection is attempted.

Dr. Barnard states that there is a mistake in his published account of the entopterygoidal dentition and has asked the present writer to correct it. On page 232 (Barnard *loc. cit.*) the replacer row on the entopterygoids is recorded as being on the "outer" side of the operative row; this should read "inner" side.

A re-examination of the dentition of the *Paragalaxias* seemed necessary, and this was facilitated by the courtesy of Mr. N. J. B. Plomley, Director of the Queen Victoria Museum, Launceston, who made available some of the specimens that had been used by Mr. E. O. G. Scott when he was at the Museum; Mr. Plomley also collected fresh material. Ordinary examination of these specimens revealed a very distinct row of rather strong conical teeth with no indication of a second row, but when one of them was cleared in a little of the reagent from one of Dr. Barnard's tubes each jaw showed a well defined decumbent row in addition to the operative row. The dentition of *Paragalaxias shannonensis* is therefore identical in this respect with that of the South African species *zebratus* and the five New Zealand species used for comparison, namely, *fasciatus*, *lynx*, *attenuatus*, *paucispondylus* and *vulgaris*. A similar condition exists in *Neochanna apoda*.

The description of the open pores on the head of *Paragalaxias* seems to imply a difference from the arrangement usually found in *Galaxias*, but this is owing to the pores adjacent to the nostrils being unrecorded. In the specimens of *P. dissimilis* examined by the writer the pores are large, but their number is normal. On the dorsal surface of the head there is one pore on the inner side of each anterior nostril, one on the inner side of each posterior nostril separated from the nostril by only a thin partition and the openings actually confluent, two pairs in the interorbital space, and one pore behind the upper part of each eye slightly to the rear of the posterior interorbital pair. Each side of the head carries nine pores, there being one on the outer side of the anterior nostril, two preorbital, one suborbital, and five around the edge of the preoperele, the upper pair of which may be confluent thus forming a long slot. On the ventral surface there are two pores on each side below the lower jaw.

The opinion expressed by the writer in 1945—that *Paragalaxias* appeared inadmissable to the family Galaxiidae—is now in need of revision, partly on account of the circumstances noted above but more particularly because the dorsal fin position no longer provides a sharp distinction between this fish and other galaxiids. The data presented previously showed that in New Zealand species of *Galaxias* and *Neochanna* the dorsal fin was inserted at from 0·68 to 0·80 of the standard length, so that a definite gap is manifest between the anterior extreme for these species and the position of the fin in *Paragalaxias*, which is indicated by the published figures as being inserted at about 0·55. At that time Dr. Barnard's paper, which gives the only adequate account of the South African species *zebratus*, was not available to the writer. Its subsequent receipt, together with specimens of *zebratus*, including examples of the variety *punctifer*, showed that this species partly fills the gap between the New Zealand galaxiids and *Paragalaxias shannonensis* of Tasmania. The ten largest specimens of *shannonensis* available, which range from 35 mm. to 50·5 mm. in total length, have a dorsal insertion ratio of from 0·52 to 0·59, while in ten specimens of *zebratus* ranging from 50 mm. to 67 mm. in total length the ratio is 0·55 to 0·63. The number of vertebrae also indicates the affinity of these two forms: in ten specimens of *shannonensis* dissected by the writer the number ranges from 37 to 43 (without hypural) while in a group of five *zebratus* the range is 38 to 39. Further agreement exists in the number of rays in the ventral fin, both species being dominantly 6-rayed. The examination of ten specimens of *shannonensis* revealed two in which one fin had only 5 rays, and in a similar group of *zebratus* there was one fin with 7 rays. Barnard records that *zebratus* becomes sexually mature at a length of 38 to 40 mm., and that the number of eggs seldom if ever exceeds 50. A low egg number occurs in the Tasmanian species also: a mature female measuring 45 mm., taken on November 20, 1949, contained 88 eggs ranging from 1·2 mm. to 1·4 mm. in diameter.

Another species recorded as having an anteriorly placed dorsal fin and 6-rayed ventrals is *G. dissimilis* Regan (1906). The species was based on a single specimen, and Stokell (1945) expressed the opinion that the fish would prove to be a deformed specimen with a number of vertebrae fused. In order to determine the true position the writer applied to Dr. E. Trewavas, Ichthyologist at the British Museum, who very kindly had a series of X-ray photographs made from the unique holotype (Plate IA). They show 41 normal vertebrae with no trace of deformity. The fish also agrees with *Paragalaxias shannonensis* in having the dorsal fin composed of more rays than the anal. The numbers in *dissimilis*, as obtained from the X-ray photograph, are: D.14, A.9 (all counted); in *shannonensis* (ten specimens) D. 14-16, A. 7-10. Other specifications of *dissimilis*

are:—head in standard length about 3·2, dorsal inserted at about 0·58 of standard length, anal originating about opposite twelfth ray of dorsal. These particulars agree so closely with those of *shannonensis* that, taking into consideration the greater size of the type of *dissimilis* (total length about 75 mm.) and the probability of differential growth affecting the comparison, the two species cannot be maintained as distinct. The specific name *dissimilis* Regan must therefore take precedence over *shannonensis* Scott. The locality of *dissimilis* is uncertain (? Queensland), and in view of the further circumstance that the species has never been re-collected from the mainland of Australia it seems likely that the original specimen actually came from Tasmania.

The genus *Paragalaxias* is now much less distinct than it appeared when first described and it seems possible that it may ultimately intergrade with *Galaxias*, but in the present state of knowledge the species *dissimilis* and *zebratus* form a natural group which requires to be distinguished in some way. The provisional retention of the genus *Paragalaxias* appears to be the course least likely to cause further complications. The two species may be defined as follows:

Paragalaxias dissimilis Regan.

Galaxias dissimilis Regan, 1906.
Paragalaxias shannonensis Scott, 1935.
Querigalaxias dissimilis Whitley, 1935.

Teeth in jaws and entopterygoids uniserial, conical, without canines; lingual teeth in two rows, hooked. Vertebrae 37-43 (without hypural). Dorsal fin rays ii-iv 10-12, anal i-ii 5-8. Head 3·2-3·8 in standard length. Dorsal inserted at 0·54-0·59 of standard length, ventral at 0·52-0·54. Maximum total length 75 mm. (Holotype).

Paragalaxias zebratus Castelnau

Cobitis zebratus Castelnau, 1861.
Cobitis punctifer Castelnau, 1861.
Galaxias zebratus Regan, 1906.
Galaxias punctifer Regan, 1906.
Galaxias (Agalaxis) zebratus Scott, 1935.
Galaxias zebratus Barnard, 1943.

Dentition similar to that of *dissimilis*. Vertebrae 38-39. Dorsal rays ii-iv 8-9. Anal rays ii-iv 8-9. Head 3·9-4·8 in standard length. Dorsal inserted at 0·55-0·63 of standard length, ventral at 0·43-0·49. Maximum total length observed 67 mm.

The above description includes specifications of the form known as *punctifer* which, in the writer's opinion, cannot be specifically separated from *zebratus*. In the material available the numerical characters are identical but some differences occur in the proportionate measurements, the most important of which are a more anterior dorsal and ventral fin insertion in *punctifer* and a longer head. Of the three characters, the head in standard length ratio shows the greatest difference, the values being 4·6 to 4·8 for *zebratus* and 3·9 to 4·0 for *punctifer*. It must be noted, however, that the present material totals only sixteen specimens, and that Dr. Barnard asserts the body proportions to be quite incapable of separating the two forms when large groups are examined. It would thus appear that if subspecies, varieties or races are recognised they must be regarded as intergrading both morphologically and geographically.

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REFERENCES.

BARNARD, K. H., 1943.—Revision of the indigenous fishes of the S.W. Cape region. *Ann. S. Afr. Mus.*, 36, 2 : 101-262.

CASTELNAU, F. L. DE L. DE., 1861.—*Mémoire sur les poissons de l'Afrique australe.* (Paris.)

REGAN, C. T., 1906.—A revision of the fishes of the family Galaxiidae. *Proc. zool. Soc. Lond.*, for 1905, 2 : 363-384, pls. 10-13.

SCOTT, E. O. G., 1935.—On a new genus of fishes of the family Galaxiidae. *Pap. roy. Soc. Tasm.*, for 1934 : 41-46, pl. 3.

STOKELL, G., 1945.—The systematic arrangement of the New Zealand Galaxiidae. Part 1.—Generic and sub-generic classification. *Trans. roy. Soc. N.Z.*, 75, 2 : 124-137, pls. 8-12.

WHITLEY, G. P., 1935.—Whitebait. *Vict. Nat.*, 52, 3 : 41-51, pl. 3.

PLATES.

PLATE I :

A. *Paragalaxias dissimilis* : X-ray photograph of holotype in British Museum.

B. *Paragalaxias dissimilis* : specimen from Shannon Lagoon (Great Lake), Central Plateau, Tasmania.